

Ideonella sakaiensis (Plastic-degrading microbe)

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Why in News?

Recently, Scientists are exploring microbial degradation as a solution to plastic pollution, utilizing bacteria and fungi to break down plastics.

- **Ideonella sakaiensis** is a bacterium with a unique ability to break down **polyethylene terephthalate (PET)**, a common type of plastic.
- It is a Gram-negative, rod-shaped, motile, non-spore-forming, non-pigment-producing, monotrichous bacterium.
- **Genus** - Ideonella.
- **Family** - Comamonadaceae / Sphaerotilaceae
- **Discovered by** - A group of Japanese researchers led by Kohei Oda and Kenji Miyamoto of Kyoto Institute of Technology and Keio University.
- **Characteristics** - It was discovered from PET contaminated soil, suggesting its main habitat to be the environment, mainly soil with enriched plastic wastes.
- They are found in **oxygen-rich rich moist soil and sewage sludge**.
- **Advantages** - It can completely degrade polyethylene terephthalate (PET).
- It breaks PET into its environmentally benign building blocks and it can be used as food by *I. sakaiensis* and other organisms.
- **Other microbes that decompose natural polymers** - **Cellulose** (plant fibres), **Chitin** (found in fungi and insects) and **Cutin** (found on the surfaces of leaves).
- **Plastic-degrading microbes**- **Gordonia** and **Arthrobacter**, that degraded polypropylene and polystyrene by nearly 23 % and 19.5 % respectively.
- **Waxworms (Galleria mellonella)** - It can eat plastic bags.
- It does not naturally consume plastic, they are common pests in beehives where they feed on honeycomb.
- Honeycomb is similar to polyethylene, the main component of plastic bags.

Quick facts

- **Polyethylene terephthalate (PET)** - It is a strong, stiff synthetic fibre and resin and a member of the polyester family of polymers.
- The plastic most commonly used in bottles and food packaging.
- It is produced by the polymerization of ethylene glycol and terephthalic acid.
- Its fibres can be blended with wool and cotton fibres to reinforce their properties.

References

1. [Down to earth| Ideonella sakaiensis](#)
2. [Microbe Notes| A Guide to Ideonella sakaiensis](#)
[Import of Polyethylene terephthalate](#)

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